PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 0000055347/ERU	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
International application No. PCT/EP2005/001434	International filing date *(day/month/year)* 12.02.2005	Priority date *(day/month/year)* 16.02.2004
International Patent Classification (IPC) or national classification and IPC INV. A01N25/10		
Applicant BASF AKTIENGESELLSCHAFT et al.		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 7 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *sent to the applicant and to the International Bureau)* a total of 6 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☒	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☒	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
14.12.2005	06.06.2006
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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2005/001434

Box No. I Basis of the report

1. With regard to the **language**, this report is based on

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of:
   - ☐ international search (under Rules 12.3(a) and 23.1(b))
   - ☐ publication of the international application (under Rule 12.4(a))
   - ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

   Description, Pages

   1-34 as originally filed

   Claims, Numbers

   1-18 received on 15.12.2005 with letter of 14.12.2005

   ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application,

☒ claims Nos. 3,4,9,10

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination *(specify)*:

☐ the description, claims or drawings *(indicate particular elements below)* or said claims Nos. are so unclear that no meaningful opinion could be formed *(specify)*:

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed *(specify)*.

☒ no international search report has been established for the said claims Nos. 3,4,9,10

☐ a meaningful opinion could not be formed without the sequence listing; the applicant did not, within the prescribed time limit:

☐ furnish a sequence listing on paper complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Preliminary Examining Authority in a form and manner acceptable to it.

☐ furnish a sequence listing in electronic form complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Preliminary Examining Authority in a form and manner acceptable to it.

☐ pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rules 13*ter*.1(a) or (b) and 13*ter*.2.

☐ a meaningful opinion could not be formed without the tables related to the sequence listings; the applicant did not, within the prescribed time limit, furnish such tables in electronic form complying with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions, and such tables were not available to the International Preliminary Examining Authority in a form and manner acceptable to it.

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in electronic form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.

☐ See separate sheet for further details

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1,2,5-8,11-18
	No:	Claims	-
Inventive step (IS)	Yes:	Claims	-
	No:	Claims	1,2,5-8,11-18
Industrial applicability (IA)	Yes:	Claims	1,2,5-8,11-18
	No:	Claims	-

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Re Item III

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The subject-matter of claims 3, 4, 9 and 10 covers embodiments which have not been searched. Indeed, no monomer (c') is present in the acrylate copolymer of claims 3 and 9. In addition, the presence of a styrene (d') is optional in the acrylate copolymer of claims 4 and 10.
In accordance with Rule 66.1(e) PCT, said **claims 3, 4, 9 and 10** will therefor not be discussed in the present report.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Novelty (Article 33(2) PCT)

JP 08-275621 (**D1**) discloses the coating of rice seeds with adhesive resin layers containing agrochemicals. Styrene butadiene rubber (SBR) latex, ethylene-vinyl acetate or acrylic-styrene copolymers are used in the seed coating process (see cited parts in the international search report). The present copolymers with a specific glass transition temperature (Tg) are however not disclosed in said document.
N.B. In example 5, table 5, paragraph [0048], Movinyl DM-60 (butyl acrylate-methyl acrylate-styrene copolymer) is used. The Tg of said resin is 0°C according to the Applicant. Said example therefore anticipates the subject-matter of claims 3 and 4).

WO 02/080675 (**D2**) discloses seed coatings comprising a combination of a polymeric emulsion and a pesticidal agent to control the release rate of said agent. The glass temperature of the polymer coating can be within the range of from -5°C to 75°C, thus overlapping the present claimed range. Polymers that are suitable for use in the method of said document include acrylonitrile butadiene styrene terpolymer, acrylic resins and co-polymers: polymethacrylate, polyethyl methacrylate,

polymethylmethacrylate, methylmethacrylate or ethylmethacrylate copolymers with other unsaturated monomers, ethylene vinyl acetate polymers and copolymers, styrene butadiene copolymers and styrene-acrylic copolymers. Rice seeds are cited amongst other seeds to be treated by the disclosed method (see cited parts in the international search report).
The present formulations comprising specific copolymers are however not disclosed in said document.

EP 1 078 563 (**D3**) relates to seed coating compositions containing one polymer, preferably having a Tg of from -40°C to 10°C and an optional pesticidal agent. Any seed can be treated by the method, in particular rice seeds (see cited parts in the international search report).
The present formulations comprising specific copolymers are however not disclosed in said document.

EP 0 187 341 (**D4**) discloses seed coating compositions comprising (co-)polymers of acrylic acid and esters of acrylic acid and an adjuvant, in particular a pesticidal agent. Rice seeds are cited as a suitable target for said compositions (see cited parts in the international search report).
The present formulations are not disclosed in said document.

US 5,849,320 (**D5**) discloses insecticidal seed coatings containing one or more binders and an insecticide. Among the binder list, polyhydroxyethyl acrylate and vinyl acetate-ethylene copolymers are cited (see also *example 1*). Rice seeds is a suitable target (see cited parts in the international search report).
The present formulations are not disclosed in said document.

The subject-matter of **claims 1, 2, 5-8 and 11-18 thus appears to be novel** over the cited prior art.

2. Inventive step (Article 33(3) PCT)

As noted under item 1. above, documents **D1-D5** disclose the use of acrylate, styrene butadiene rubber (SBR) latex and ethylene vinyl acetate copolymers for coating

seeds, in particular rice seeds.

The problem posed by the present application is to provide seed treatment formulations which keep the pesticidal agent on the seed and prevent significant release thereof into the environment (see *page 2, lignes 30-33*).

The proposed solution consists in using some polymers belonging to the above-mentioned families which have specific Tg values.

It is well-known in the art that when the temperature is below the Tg value, a polymer becomes rigid and brittle, can crack and shatter. Depending on the climatic conditions of the region where the seed formulation is to be used, the man skilled in the art, trying to prepare such seed formulations which keep the pesticidal agent on the seed and prevent significant release into the environment, would have necessarily chosen a sticker which does not crack and shatter and would choose its stickers accordingly.

The present selection of (co)polymers is therefor not regarded as involving any inventive step.

3. Industrial applicability (Article 33(4) PCT)

Industrial applicability of the subject-matter of claims 1, 2, 5-8 and 11-18 as claimed is acknowledged.

Re Item VII
Certain defects in the application (form or content)

4.1 The subject-matter of claim 12 should refer to claim 11. The same applies to claims 18 and 17.

4.2 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in documents **D1** and **D3-D5** is not mentioned in the description, nor are these documents identified therein.

Claims

1. A seed treatment formulation comprising

(a) at least one pesticidal agent; and

(b) a carboxyl group containing polymer or copolymer selected from the group consisting of styrene butadiene rubber latex polymers with a glass transition temperature of –40°C to 5°C, acrylate copolymers and ethylene vinyl acetate copolymers, wherein

(i) the acrylate copolymers consist of

(a') acrylic acid, methacrylic acid or itaconic acid or a combination of at least two monomers selected from the group consisting of acrylic acid, methacrylic acid or itaconic acid; and

(b') monomers selected from the group consisting of alkyl (meth)acrylates such as methyl (meth)acrylate, ethyl (meth)acrylate, n-propyl (meth)acrylate, n-butyl meth)acrylate, t-butyl (meth)acrylate, lauryl (meth)acrylate, cyclohexyl (meth)acrylate 2-ethylhexyl (meth)acrylate, stearyl (meth)acrylate, dodecyl(meth)acrylate and (meth)acrylamides such as dimethyl(meth)acrylamide, diethyl(meth)acrylamide, isopropyl(meth)acrylamide,(meth)acryloyl morpholine, dimethylaminomethyl(meth)acrylamide, dimethylaminoethyl(meth)acrylamide, dimethylaminopropyl(meth)acrylamide, diethylaminomethyl(meth)acrylamide, diethylaminoethyl(meth)acrylamide, diethylaminopropyl(meth)acrylamide; and

(c') monomers selected from the group consisting of 2-hydroxyethyl acrylate, 2-hydroxypropyl acrylate, 2-hydroxyethyl methacrylate, 2-hydroxypropyl methacrylate, glycidyl (meth)acrylate; and

(d') monomers selected from the group consisting of styrene and styrene derivatives such as styrene, α-methyl styrene, o-methyl styrene, m-methyl styrene p-methyl styrene, p-t-butyl styrene, p-chloromethyl styrene, p-styrenesulfonic acid and its sodium or potassium salt, o-methoxystyrene, m-methoxystyrene, p-methoxystyrene;

and have either a glass transition temperature of –40°C to 5°C; or, if the acrylate copolymers have a core/shell structure a glass transition temperature of the inner core of –60°C to 5°C and of the outer shell of 20°C to 150°C; and

(ii) the ethylene vinyl acetate polymers consist of vinyl acetate, ethylene and acrylic acid and have a glass transition temperature of –25°C to -5°C.

2. A seed treatment formulation according to claim 1, wherein the carboxyl group containing polymer or copolymer is an acrylate copolymer as defined in claim 1.

3. A seed treatment formulation comprising

(a) at least one pesticidal agent; and

(b) an acrylate copolymer comprising

(a') either acrylic acid, methacrylic acid or itaconic acid or a combination of at least two Monomers selected from the group consisting of acrylic acid, methacrylic acid or itaconic acid; and

(b') methyl methacrylate, ethyl acrylate, n-butyl acrylate, cyclohexyl methacrylate, 2-ethylhexyl acrylate or (meth)acrylamide; and

(d') styrene, wherein the acrylate copolymer has either a glass transition temperature of –40°C to 5°C; or, if the acrylate copolymers have a core/shell structure a glass transition temperature of the inner core of –60°C to 5°C and of the outer shell of 20°C to 150°C;

4. A seed treatment formulation comprising

(a) at least one pesticidal agent; and

(b) an acrylate copolymer comprising

(a') acrylic acid, methacrylic acid or itaconic acid or a combination of at least two monomers selected from the group consisting of acrylic acid, methacrylic acid or itaconic acid, from 0.2 % (w/w) to 6% (w/w); and

(b') methyl methacrylate, ethyl acrylate, n-butyl acrylate, cyclohexyl methacrylate, 2-ethylhexyl acrylate or (meth)acrylamide from 50 % (w/w) to 99.8 % (w/w); and

(d') styrene from 0% (w/w) to 50% (w/w) wherein the acrylate copolymer has either a glass transition temperature of –40°C to 5°C; or, if the acrylate copolymers have a core/shell structure a glass transition temperature of the inner core of –60°C to 5°C and of the outer shell of 20°C to 150°C.

5. A seed treatment formulation according to claim 1 , wherein the copolymer is an ethylene vinyl acetate copolymer as defined in claim 1.

6. A seed treatment formulation according to claim 1, 2, 3 or 4, wherein the copolymer is an acrylate copolymer having a core shell structure.

7. A seed treatment formulation according to any of claims 1 to 5, wherein the amount of the carboxylgroup containing polymer is between 0.5 and 15 % (w/w) on a solid content base.

8. Use of a carboxyl group containing polymer or copolymer selected from the group consisting of styrene butadiene rubber latex polymers with a glass transition temperature of –40°C to 5°C, acrylate copolymers and ethylene vinyl acetate copolymers, wherein

(i) the acrylate copolymers consist of

(a') acrylic acid, methacrylic acid or itaconic acid or a combination of at least two monomers selected from the group consisting of acrylic acid, methacrylic acid or itaconic acid; and

(b') monomers selected from the group consisting of alkyl (meth)acrylates such as methyl (meth)acrylate, ethyl (meth)acrylate, n-propyl (meth)acrylate, n-butyl meth)acrylate, t-butyl (meth)acrylate, lauryl (meth)acrylate, cyclohexyl (meth)acrylate 2-ethylhexyl (meth)acrylate, stearyl (meth)acrylate, dodecyl(meth)acrylate and (meth)acrylamides such as dimethyl(meth)acrylamide, diethyl(meth)acrylamide, isopropyl(meth)acrylamide,(meth)acryloyl morpholine, dimethylaminomethyl(meth)acrylamide, dimethylaminoethyl(meth)acrylamide, dimethylaminopropyl(meth)acrylamide, diethylaminomethyl(meth)acrylamide, diethylaminoethyl(meth)acrylamide, diethylaminopropyl(meth)acrylamide; and

(c') monomers selected from the group consisting of 2-hydroxyethyl acrylate, 2-hydroxypropyl acrylate, 2-hydroxyethyl methacrylate, 2-hydroxypropyl methacrylate, glycidyl (meth)acrylate; and

(d') monomers selected from the group consisting of styrene and styrene derivatives such as styrene, α-methyl styrene, o-methyl styrene, m-methyl styrene p-methyl styrene, p-t-butyl styrene, p-chloromethyl styrene, p-styrenesulfonic acid and its sodium or potassium salt, o-methoxystyrene, m-methoxystyrene, p-methoxystyrene;

and have either a glass transition temperature of –40°C to 5°C; or, if the acrylate copolymers have a core/shell structure a glass transition temperature of the inner core of –60°C to 5°C and of the outer shell of 20°C to 150°C; and

(ii) the ethylene vinyl acetate polymers consist of vinyl acetate, ethylene and acrylic acid and have a glass transition temperature of –25°C to -5°C

for the preparation of a seed treatment formulation.

9. Use of an acrylate copolymer comprising

(a) either acrylic acid, methacrylic acid or itaconic acid or a combination of at least two Monomers selected from the group consisting of acrylic acid, methacrylic acid or itaconic acid; and

(b) methyl methacrylate, ethyl acrylate, n-butyl acrylate, cyclohexyl methacrylate, 2-ethylhexyl acrylate or (meth)acrylamide; and

(d) styrene wherein the acrylate copolymer has either a glass transition temperature of –40°C to 5°C; or, if the acrylate copolymers have a core/shell structure a glass transition temperature of the inner core of –60°C to 5°C and of the outer shell of 20°C to 150°C;

for the preparation of a seed treatment formulation.

10. Use of an acrylate copolymer comprising

(a) acrylic acid, methacrylic acid or itaconic acid or a combination of at least two monomers selected from the group consisting of acrylic acid, methacrylic acid or itaconic acid, from 0.2 % (w/w) to 6% (w/w); and

(b) methyl methacrylate, ethyl acrylate, n-butyl acrylate, cyclohexyl methacrylate, 2-ethylhexyl acrylate or (meth)acrylamide from 50 % (w/w) to 99.8 % (w/w); and

(d) styrene from 0% (w/w) to 50% (w/w), wherein the acrylate copolymer has either a glass transition temperature of –40°C to 5°C; or, if the acrylate copolymers have a core/shell structure a glass transition temperature of the inner core of –60°C to 5°C and of the outer shell of 20°C to 150°C;

for the preparation of a seed treatment formulation.

11. Seeds treated with a formulation according to any of claims 1 to 7.

12. Rice seeds treated with a formulation according to any of claims 1 to 7.

13. A method for the treatment of a seeds prior sowing comprising the following steps:

a) applying to a solvent a formulation according to any of claims 1 to 7; and

b) applying to a seed the mixture obtained in step a).

14. A method according to claim 13 for the treatment of a seeds prior sowing, wherein the seeds are rice seeds.

15. Use of a formulation according to any of claims 1 or 7 in a seed priming process.

16. A method for the treatment of a seeds prior sowing in a seed priming process comprising the following steps:

(i) hydration of seeds under controlled conditions followed by germination of seeds under controlled conditions;

(ii) treatment of seeds with a formulation according to any of claims 1 to 7;

wherein

(a) the hydration can be done in first and the treatment of seeds with a formulation according to any of claims 1 to 7 in a second step or,

(b) the treatment of seeds with a formulation according to any of claims 1 to 7 can be done first followed by the hydration of seeds.

17. A method for the control of undesired vegetation and/or combating phytopathogenic insects and/or phytopathogenic fungi comprising applying a formulation according to any of claims 1 to 7 to seeds prior sowing.

18. A method for the control of undesired vegetation and/or combating phytopathogenic insects and/or phytopathogenic fungi comprising applying a formulation according to any of claims 1 to 7 to rice seeds prior sowing.